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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/553,362

06/13/2007

Karl Brotzmann

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06/09/2011

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MINNEAPOLIS, MN 55402

EXAMINER

YANG, JIE

ART UNIT

PAPER NUMBER

1733

NOTIFICATION DATE

DELIVERY MODE

06/09/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IP@FREDLAW.COM

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/553,362	BROTZMANN, KARL	
	<b>Examiner</b>	<b>Art Unit</b>	
	JIE YANG	1733	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                            | 6) <input type="checkbox"/> Other: _____                          |

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## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/17/2011 has been entered.

### ***Status of the Claims***

Claims 1-13 are pending in application. No amendments to the claims have been made according to the last office action marked 11/19/2010.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deloche et al (US 6,030,431, thereafter US'431) in view of Galperin et al (US 5,417,740, thereafter US'740).

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Regarding claim 1, US'431 teaches a method for improving energy input in heating and melting of scrap bulk (Abstract of US'431), which includes burning a channel into scarp bulk with oxygen-containing gas (abstract of US'431), adding fossil fuel (Col.2, lines 16-17), and inputting additional energy for the heating and melting of the scrap bulk (claim 1 of US'431). Regarding the limitation of "hot blast", this limitation can be read as additional energy taught by US'431. The channel is formed in the upper area (Col.3, line 43), and US'431 specifies that: "In general, the gas introduction nozzles can be installed anywhere, but preferably are installed at least 30 cm above the bath surface--when using oxygen, at least 80 cm above the bath surface." (Col.3, lines 61-65 of US'431), which reads on the limitation of the hot blast being supplied from a top position as recited in the instant claim. US'431 does not specify a vessel having side and top walls and feeding hot blast to the scrap bulk from the top wall as recited in the instant claim. US'740 teaches a method for producing steel (Title and abstract of US'740). US'740 teaches vessel with side and top walls (Fig. 4 and 5 of US'740) and US'740 teaches blowing oxygen rich oxidizing gas from movable top lancing and charging the slag forming materials, coal, and additional carbon materials (Fig.4 and Col.13, line 32 to Col.18, line 25 of US'740), which reads

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on the wall structure and feeding hot blast from the top wall as recited in the instant claim. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vessel structure of US'740 and to apply the hot blast from the top wall as demonstrated by US'740 in the process of US'431 because both US'740 and US'431 teach steel processing and US'740 teaches the advantages of top feeding method (Col.14, line 53 to Col.15, line 17 of US'740).

Regarding claim 2, US'431 does not disclose that the hot blast supply occurs centrally from the top. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the hot blast supply centrally from the top because US'431 teaches: "In general, the gas introduction nozzles can be installed anywhere, but preferably are installed at least 30 cm above the bath surface--when using oxygen, at least 80 cm above the bath surface."

(Col.3, lines 61-65 of US'431). Furthermore, US'740 teaches a method for producing steel (Title and abstract of US'740) and US'740 teaches blowing the hot blast onto the scrap bulk from a central top position (Fig.1-3 of US'740). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to blow hot blast from the central top position as demonstrated by US'740 in the process of US'431

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because US'740 teaches the advantages of top feeding method (Col.14, line 53 to Col.15, line 17 of US'740).

Regarding claim 3, US'431 teaches two hot draft jets (Col.4, lines 3-4), which reads on the hot blast being divided into several separate jets as recited in the instant claim.

Regarding claim 11, US'431 does not specify the blast velocities for the two phases. The exit velocity is 600m/s (Col.2, line 11 of US'431). The reduction is at least 10-30% (Col.3, line 17 of US'431), which reads on 420-540m/s. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the claimed range is taught by US'431, since in the case where the claimed range overlap or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists. See MPEP 2144.05.

Regarding claim 12, US'431 teaches adding 30% of oxygen (Col.3, line 45 of US'431) and fuel subsequently (Col.3, line 48 of US'431), which is within the claimed 30-50% oxygen range as recited in the instant claim. US'431 is silent with respect to oxygen enrichment, which meets the limitation of no or hardly any oxygen enrichment in phase 2 as recited in the instant claim.

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Regarding claim 13, US'431 does not teach the distance of the hot blast jet to the surface in phases 1 and 2. However, US'431 teaches at least 80cm (Col.3, line 63) from the bath surface. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the claimed range is taught by US'431, since in the case where the claimed range overlap or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists. See MPEP 2144.05.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'431 in view of US'740 and further in view of JP 01219116 A thereafter JP'116.

US'431 in view of US'740 is applied to independent claim 1 as discussed above, however, US'431 in view of US'740 does not disclose distributing hot blast through a central jet with 35-65% of the total amount as claimed. JP'116 teaches a converter refine method. To enhance a secondary combustion ratio and to increase the compounding ratio of scrap by specifying the height position of a lance nozzle having main holes and auxiliary holes and specifying the angle of the oxygen jet to the blown through the auxiliary holes 3 is specified to 30-60° with perpendicular and the oxygen flow rate ratio through the auxiliary holes expressed by the equation (the total oxygen flow rate = the

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oxygen flow rate through the main holes + the oxygen flow rate through the auxiliary holes) is specified to 65-80% (abstract of JP'116). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the oxygen in the central jet in US'431 in view of US'740 and JP'116 as claimed since JP'116 teaches enhancing a secondary combustion ratio and to increasing the compounding ratio of scrap.

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'431 in view of US'740, and further in view of Kundrat et al (US 5,702,502, thereafter US'502) and Hirai et al (US 4,334,921, thereafter US'921).

US'431 in view of US'740 is applied to independent claim 1 as discussed above, however, US'431 in view of US'740 does not disclose supplying hot blast via a vertically adjustable lance as in claim 5 or rotating around the vertical axis as in claim 6. US'502 teaches a lance used to inject oxygen gas (Abstract of US'502). It would have been obvious to one of ordinary skill in the art at the time the invention was made to inject oxygen gas with a lance, since using lances to inject oxygen gas in converters is well known as taught by US'502 (Col.1, lines 52-54, Col.2, lines 18-21, and lines 37-38 of US'502). US'921 teaches a converter steelmaking process. The height of the



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oxygen blowing lance is controlled depending on the type of steel to be made and the flow rate of the bottom blown gas (Col.2, lines 1-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to vertically adjust the lance or rotate the lance, since making a device adjustable is not a patentable advance, and US'921 teaches that the type of steel to be made is related to the height of the lance.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'431 in view of US'740, and further in view of Stercho (US 20020088102 A1, thereafter PG'102).

US'431 in view of US'740 is applied to independent claim 1 as discussed above, US'431 in view of US'740 does not disclose a hot heel as in claim 7 or a hot heel of 10-30% as recited in claim 8. PG'102 teaches that a maintaining a liquid metal heel in the furnace (Paragraph [0027] of PG'102). It would have been obvious to one of ordinary skill in the art at the time the invention was made to maintain the heel as taught by PG'102, since PG'102 teaches that a liquid metal heel provides a substantial thermal benefit after tapping to maintain flat bath

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operation throughout the charging of scrap and/or other forms for charging material (Paragraph [0027] of PG'102).

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'431 in view of US'740, and further in view of Hikosaka et al (US 4,908,059, thereafter US'059).

US'431 in view of US'740 is applied to independent claim 1, US'431 in view of US'740 does not disclose injecting with bottom blowing tuyeres as in claim 9 or the installation as in claim 10. US'059 teaches melting cold iron material (title of US'059) such as scrap (abstract of US'059). Oxygen is injecting via lower oxygen injection holes for combustion (Col.5, line 9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bottom blowing tuyeres in the process of US'431, since US'059 teaches that the sensible heat of the combustion gas is used to preheat the iron material phase in the furnace as it climbs therethrough (Col.5, lines 10-14 of US'059).

### ***Response to Arguments***

Applicant's arguments filed on 5/17/2011 with respect to claims 1-13 have been fully considered but they are not persuasive.

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Applicant's arguments are summarized as follows:

A) The applied references fail to disclose or suggest the features defined by the claims, and there would have been no apparent reason for modification to arrive at the claimed features. For the features in the independent claim 1, Deloche et al (US'431) does not disclose a vessel having side and top walls and feeding hot blast to scrap bulk from the top wall of the vessel. The gas jet of Galperin et al (US'740) does not include a fossil fuel to cut a channel in scrap bulk. Accordingly, because Galperin et al (US'740) does not include a gas jet that is any way analogous to the hot gas jet of Deloche et al (US'431), a person of ordinary skill in the art would not have found it obvious to modify the position of the nozzles in Deloche et al (US'431) based on the teaching of Galperin et al (US'740).

B) Galperin et al (US'740) does not disclose a solution to the problems of the Deloche et al (US'431) method, For example the chimney-like effect and Galperin et al (US'740) relates to an entirely different type of furnace technology than Deloche et al (US'431) because Galperin et al (US'740) relates to basic oxygen furnaces and modified electric arc furnaces that supply cold oxidizing gas via a lance.

Responses are as follows:

Regarding the argument A), the applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ

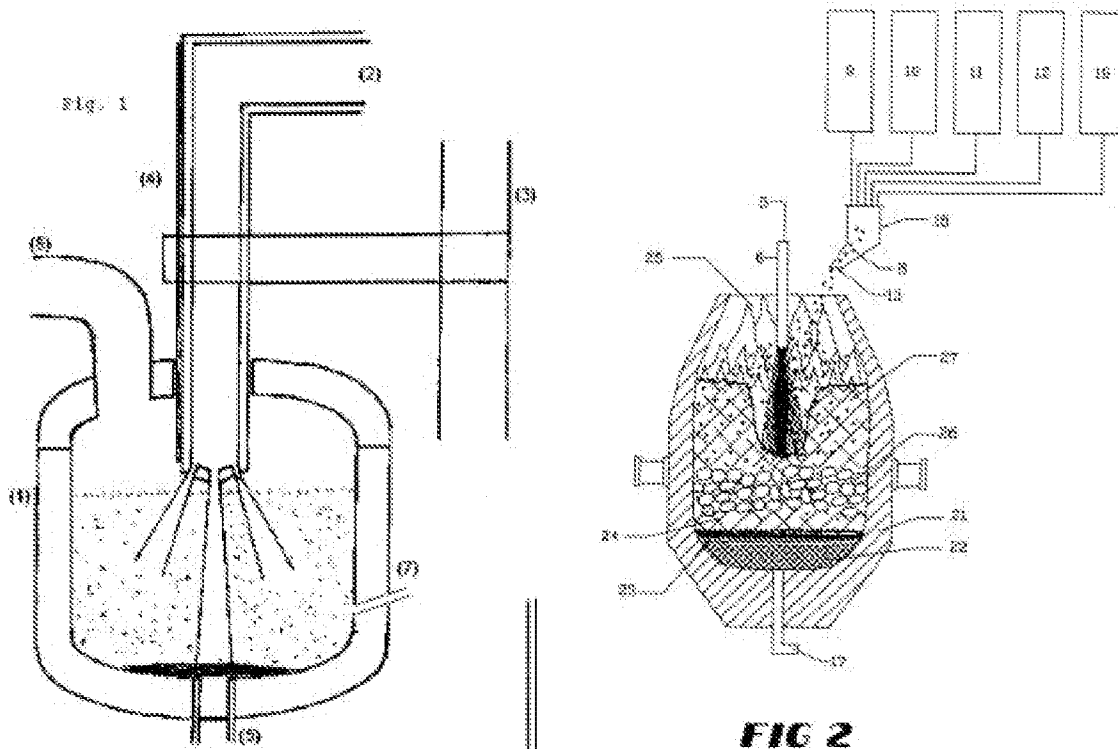
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375 (Fed. Cir. 1986). In the instant case, Deloche et al (US'431) in view of Galperin et al (US'740) teaches the limitations of instant independent claim 1. The motivations for combining these references can refer the discussions above. The Examiner notes that US'431 specifies that: "In general, the gas introduction nozzles can be installed anywhere, but preferably are installed at least 30 cm above the bath surface--when using oxygen, at least 80 cm above the bath surface." (Col.3, lines 61-65 of US'431). Although US'431 does not specify a vessel having side and top walls and feeding hot blast to the scrap bulk from the top wall as recited in the instant claim 1, US'740 teaches vessel with side and top walls (Fig. 4 and 5 of US'740) and US'740 teaches blowing oxygen rich oxidizing gas from movable top lancing and charging the slag forming materials, coal, and additional carbon materials (Fig.4 and Col.13, line 32 to Col.18, line 25 of US'740). The Examiner further notes that US'740 teaches the advantage of top feeding: "The oxidizing gas first enters in the furnace at an afterburning region 15 located at the oxygen lance working end and above the portion of solid charge pile located in the central zone of the furnace. This afterburning region 15 is oxygen rich due to the excessive presence of oxygen provided with said oxidizing gas, the flow of which is controlled to provide for oxygen delivery that is instantly needed for steel making purposes. Therefore, this first consumption region of lanced oxygen provides good conditions for burning of combustible gases emitted from the scrap pile. The excessive oxygen presence in this region does not impact negatively the metallic yield loss because of the very limited contact of the oxygen rich combustion mixture with the top of the metallic charge located in the peripheral zone 14 of the furnace. The heat

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released at the top and above the scrap pile radiates toward the scrap pile and preheats the metal and the carbonaceous material which has been charged on the top of the scrap pile.” (Col.14, line 66 to Col.15, line 17 of US’740), which provides good motivation for combining US’740 with US’431.

Regarding the argument B), the Examiner disagrees with the Applicant's argument because both Deloche et al (US’431) and Galperin et al (US’740) teach blowing oxygen content gas (Abstract and Claims 1-14 of US’431 and Abstract and claims 1-16 of US’740) for steel processing. More specifically, US’740 teaches vessel with side and top walls (Fig. 4 and 5 of US’740) and US’740 teaches blowing the hot blast onto the scrap bulk from a central top position (Fig.1-3 of US’740), which is same operation as recited in the instant invention. The comparison figures between the instant invention and that of US’740 are listed in following.



US'740 discloses blowing the hot blast onto the scrap bulk from a central top position as recited in the instant invention, therefore a similar effect—avoiding chimney-like in the furnace would be highly expected for the process of US'431 in view of US'740. MPEP 2112.01.

## Conclusion

This is a RCE of applicant's earlier Application No. 10/553362. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL**

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even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/ Roy King/  
Supervisory Patent Examiner, Art Unit 1733